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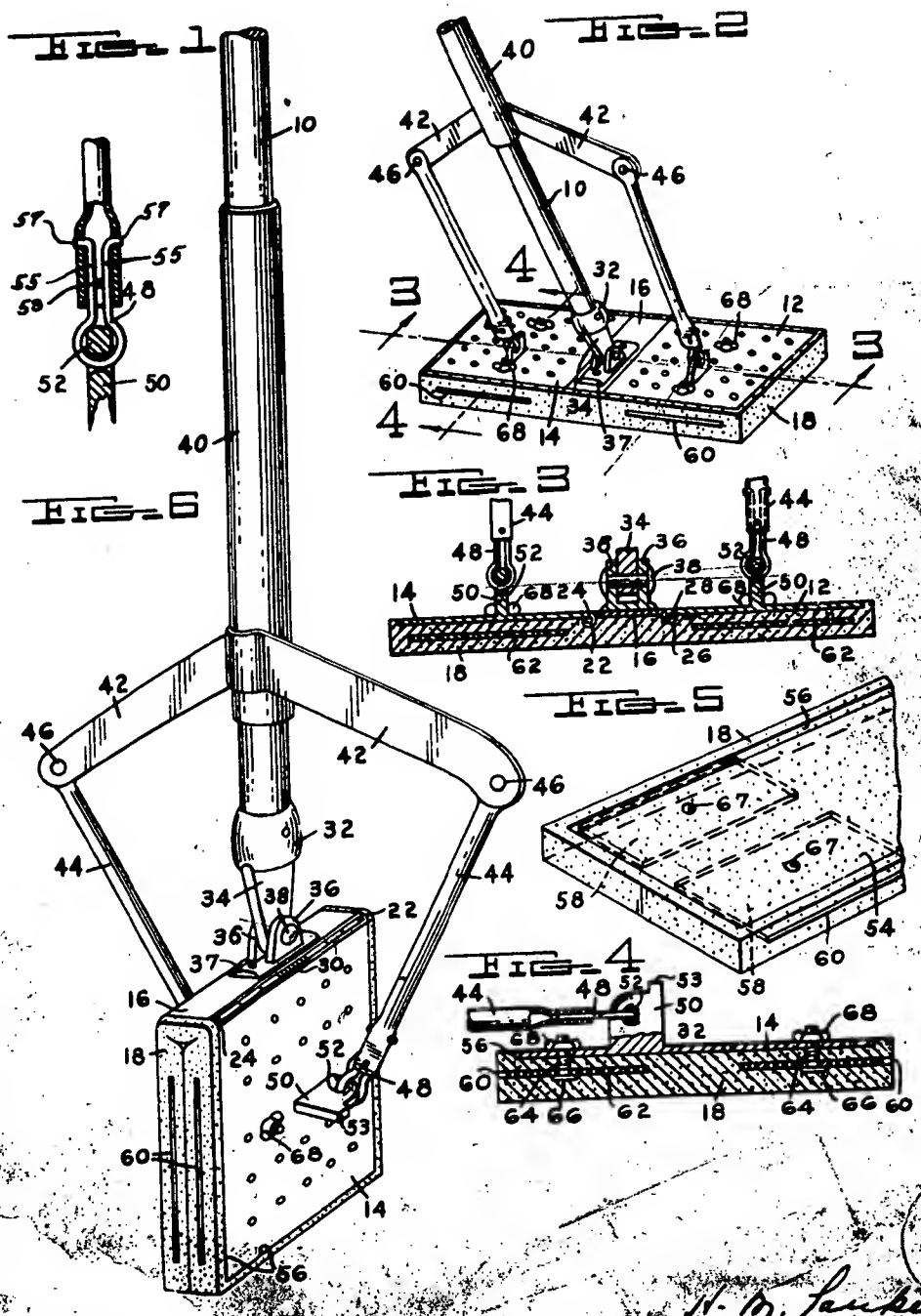

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Mop

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This invention relates to improvements in mops and particularly to improvements in so-called "self-squeezing" or "self-wringing" types of mops having means on the handle remote from the mop head for wringing the latter.

In mops of this character heretofore employed, the mop head when operated to a compressed or wringing position has been too large to enter the conventional household size pails in one operation and required awkward handling upon the part of the user to tip the mop head first on one side and then on the other side to dip the ends of the mop into a conventional size pail or bucket. This entailed two cumbersome turning actions each time the mop head was wetted in a pail and when wringing the mop head the user had to again tip the mop head in order to drain all the squeezed out liquid into the pail. In addition, such "self-wringing" types of mops were composed of parts relatively expensive to manufacture and assemble and as a result the ultimate cost to the consumer was comparatively high. Moreover, the sponge blocks or other absorptive material used in the mop head were difficult to attach and detach for cleaning and replacement.

It is an important object of this invention to provide an improved construction and arrangement of a mop of this character which in the cleaning position occupies a considerable floor area yet may be collapsed from a remote control on the handle to a relatively small size to fully enter the conventional household size pail or bucket in one operation without any awkward handling and thereby overcome the disadvantages heretofore mentioned. No awkward tipping or turning movement of the mop head is required by this invention to wet or wring out the mop head. Another important object of the invention is to provide a mop of this character which during the wringing out operation applies a strong evenly distributed pressure upon the sponge material so that all portions of the material are substantially thoroughly squeezed dry. A further important object of the invention is to provide a mop head composed of two foldable members or plates each carrying a section of absorptive material, such as sponge, which sections are constructed in a novel manner for quick attachment and detachment from the plates and are capable when attached of being drawn up tightly against the underside of the plates by means concealed therewithin. In carrying out this invention, the parts of the device are so designed that they may be manufactured and assembled at low cost and yet are sturdy and smoothly operable at all times.

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An important feature of the invention is the provision of means whereby an effective wringing action is obtained with a minimum number of parts and a minimum amount of effort. Another important feature of the invention is the provision whereby the mop handle is angularly adjustable to suit the convenience of the user and is capable, if desired, of swinging to a horizontal position parallel to the floor during mopping operations in order to go under low objects. A further important feature of the invention is the novel shape and construction of the sponge block so that when assembled on the metal parts of the mop head it provides a resilient guard over the edges of the parts to thereby prevent possible damage when the mop head is used adjacent to furniture.

Various other objects, advantages and meritorious features of the invention will become more fully apparent from the following specification, appended claims and accompanying drawings, wherein:

Figure 1 is a perspective view of the lower end of a mop structure constructed in accordance with this invention and showing a mop head in wringing position;

Figure 2 is a perspective view of the mop structure showing a mop head in operating position for cleaning a floor;

Figure 3 is a vertical sectional view taken transversely through the mop head along line 3—3 of Figure 2;

Figure 4 is a vertical sectional view taken in a fore and aft direction through the mop head along line 4—4 of Figure 2;

Figure 5 is a perspective view of the major portion of a sponge block shaped for use on the mop head of this invention, and

Figure 6 is a detail sectional view of one of the operating connections.

In the embodiment of the invention illustrated in the drawings the mop structure comprises, in general, a handle 10 to the lower end of which is attached a mop head including three members pivotally connected together and in operative mopping position occupying the same plane in side-by-side relation. The outer two members of the mop head assembly are in the form of perforated metal plates of corresponding size and shape to one another and are designated by reference numerals 12 and 14. The middle member 16 of the mop head assembly is also in the form of a metal plate but is considerably narrower in width than the two outer members. The two outer plate members 12 and 14 are of rectangular formation as shown in Figures 1 and 2 and together occupy a

considerable floor area. The middle plate member 16 is elongated in the fore and aft direction of the mop head so that its length is substantially equal to the fore and aft dimension of the plates 12 and 14. The perforations provided in the outer plate members permit the water to pass therethrough when wetting or wringing the mop head.

The swabbing or absorptive material for the mop head preferably comprises a block 18 of cellulose sponge material or other suitable spongy substance. The block may be of a size to entirely cover the underside portions of the three plate members as shown or composed of separate sections secured to the underside of the plates. The sponge block is preferably constructed in a novel manner so as to project beyond at least the front and opposite sides of the metal plates forming the mop head and upwardly over the edges thereof to form a resilient bumper for preventing direct contact of the metal plates with furniture or other objects of the floor being cleaned.

The outer two plate members 12 and 14 are pivotally connected to the long sides of the middle member section 16. This pivotal connection is preferably by hinges as shown in the drawings. The hinge connecting the plate 12 to the centre member 16 is indicated at 22 and the hinge pin therefore at 24. The hinge connecting plate 14 to the centre member is indicated at 26 and its hinge pin at 28. The leaves of the hinges may form integral parts of the side plates and be formed simultaneously therewith. The pivotal axes of the two hinges extend parallel to one another in the fore and aft direction of the mop structure. This enables the plates 12 and 14 to pivot in a side swinging motion relative to the centre plate 16 and assume a substantially parallel relation under the centre plate as shown in Figure 1. The side plates 12 and 14 are constrained to move upwardly by their pivotal connection to the centre member by resilient means in the form of coil springs associated with each hinge. This is accomplished by omitting certain of the overlapping leaves of each hinge in the middle thereof so as to expose the central section of each hinge pin. Encircling the exposed mid-section is the coil spring 30 whose opposite ends bear respectively against the underside of the centre member 16 and the side plates pivotally connected thereto by the hinge pin. The springs are of such strength and operate in such a manner as to swing the side plates 12 and 14 upwardly about their respective hinge axes and to the normal coplanar relation shown in Figure 2. Further upward movement of the outer plate members beyond this position is prevented by the abutment of the adjacent sides of the outer member and the centre member 16.

The handle 10 is connected to the central supporting member 16 of the mop head. The lower end of the handle 10 is received in a socket 32 having a flat plate extension 34. The outer end of the extension 34 is apertured and is received between two correspondingly shaped ears 36-36 mounted on a bracket 37 fixed to the central member 16 and projecting upwardly therefrom. A transverse pivot pin 38 extends through the ears 36-36 and the aperture in the lower end of the extension 34 to pivotally connect the handle to the central member 16. It is to be especially noted that the pivotal axis of the handle represented by the pin 38 extends transversely to the normal fore and aft movement of the mop head [illegible] cular to the pivotal hinge axes of the [illegible] plates 12 and 14.

[illegible] mop handle is in

actuating member preferably in the form of a sleeve 40 which encircles the handle and is capable of slidable movement therealong. The sleeve 40 is relatively long in length and extends for a substantial portion of the length of the handle 10. The upper end of the sleeve is located in spaced relationship from the mop head in convenient position for the operator to grasp the sleeve and slide it along the handle toward the mop head. The opposite or lower end of the sleeve 40 is operatively coupled by a corresponding set of articulated members to the side plates 12 and 14 of the mop head. Each set comprises two members, one of which is substantially rigidly connected to the lower end of the sleeve 40 and the other of which is substantially universally pivotally connected to the side plate with which it is associated.

Referring to Figures 1 and 2, the lower end of the sleeve 40 is provided with two arms of corresponding shape to one another designated by reference numerals 42-42 which extend laterally from opposite sides of the handle 10 in positions to overlie the two side plates 12 and 14 in spaced relation therefrom. The inner ends of the arms 42-42 are rigidly connected to the lower end of the sleeve 40. Extending between each outer plate of the mop head and arm 42 overlying the same is a connecting member or link 44. One end of the link member of each set of articulated members is pivotally connected to the arm 42 with which it is associated by means of a pin 46 extending transversely through the end of the arm. The opposite end of each link member 44 is pivotally attached to its respective side plate of the mop head by a connection which provides limited universal swinging movement of the link relative to the plate. This is accomplished, as shown in the illustrated embodiment of the invention, by the provision of a hook eye 48 secured to the end of the link member and projecting therefrom. This eye 48 of each link is interlockingly connected to an eye 50 secured to the side plate with which it is associated. The latter is provided with a hole 52 through which the eye 48 of the link passes in the manner clearly illustrated in Figure 1. To smooth the action of the connected eyes it is preferred to bevel the outer edges of the hole 52 and to round the body portion of the eye 50 passing through the hook eye 48. To limit the forward swinging movement of each link 44 relative to the eye 50 to which it is connected, the latter may be provided with an upstanding lug 53 forming a stop against the eye 48 which will strike when the handle and the links are swung forwardly beyond their vertical position.

Although various forms of connections between the links 44 and the side plates 12-12 may be used, it is preferred to use the form illustrated in the drawings and particularly in Figure 5. As shown in Figure 5, each eye 48 is formed by bending a relatively long piece of a cylindrical rod so that the two end sections 55-55 thereof extend substantially parallel to one another and enlarging the intermediate portion into the eye 48 as shown. For this form of connection the links 44-44 are formed of tubular material and have their lower ends flattened as shown for receiving the end sections 55-55 of the eye. Preferably the extremities of the end sections 55 are bent outwardly as shown at 57 and passed through aligned holes drilled in the link in the manner illustrated in Figure 6. When attaching an eye to a link the end sections 55 are drawn together and when the bent extremities [illegible]e opposite to the holes they spring outwardly [illegible] reinto locking the eye in place. Following this,

it is preferred to rivet the opposite flattened sides of the link together. A rivet **59** passing between the end section **55-55** is shown in Figure 6 for this purpose.

In constructing the mop, it is preferred to have the connecting members or eyes **50-50** on the two side plates located in the same plane as the pivoted axis formed by the pin **38** about which the handle **10** swings. The pivoted axis of the handle and the two connecting members **50-50** are also preferred to be located on a line closer to the rear edge of the mop head than to the front edge thereof as shown by the position of the member **50** in Figure 4. This will cause the middle plate **16** to swing to substantially perpendicular relation to the axis of the handle, if the latter is not already in this position, when the side plates are shifted to sponge squeezing position by the action of the handle control member as explained hereinafter.

An important feature of the pivotal connections of the respective operating members for the side plates is the fact that the axis about which each link member **44** is pivoted to the arm **42** extends in parallel relation to the hinge axes of the side plates. This will enable the link members **44-44**, as shown by a comparison of Figures 1 and 2, to swing inwardly relatively to the arms **42-42** in order to shift the side plates to the collapsed position shown in Figure 1. The universal pivotal connection of the eyes **48** and **50** enables the link members **44** to swing in a fore and aft direction relative to the side plate to which they are connected and also latterly inwardly and outwardly relative thereto. This enables the operator to collapse the side plates upon one another regardless of the position of the handle with respect to the mop head. Whether the handle is in a vertical position or in an annular position shown in Figure 2, or in horizontal position shown in Figure 4, it is possible upon slidable shiftable movement of the sleeve **40** toward the mop head to cause the side plates to swing about their respective hinges to the collapsed position shown in Figure 1.

When the handle is in angular position relative to the plane of the mop head, or is in the horizontal position shown in Figure 4, downward movement of the sleeve toward the mop head will first cause the side plates to commence their swinging movement and after they progress for a short distance in this direction, further swinging movement thereof will also cause the central member **16** to swing about its pivotal connection to the handle so that it assumes a substantial perpendicular relation to the axis of the handle. When the side plates have been completely swung under the central member **16** to their parallel position, the central member **16** will have by that time assumed a substantial perpendicular relation to the axis of the handle. Although the motion of the side plates may be divided into two separate steps wherein they first move alone and then with the central plate, the action is progressive throughout so that the side plates and the central plate progressively move to their respective final positions at the end of the stroke of the sleeve **40**.

The sponge block **18** is preferably detachably connected to the underside of the three plates of the mop head in the novel manner illustrated herein. For this purpose, the upper side of the sponge block is preferably moulded or otherwise shaped to form a depression or recess throughout substantially the entire upper surface thereof except for the marginal portions thereof. Referring to Figure 5, the central recess is indicated at **54** occupying the entire area of the top of the sponge block except for the marginal strips or portions **56** extending therearound. The large recess **54** is of a size to receive the three members **12, 14** and **16**, leaving the marginal portions **56** projecting upwardly around the edges of the plates to form a resilient guard extending completely around the plates of the mop head.

To secure the sponge block in place it is preferably provided with a series of narrow pockets or slits **58**, shown in dotted outline in Figure 5, which open out on the front and rear sides of the sponge block, one such opening being illustrated at **60** in this Figure. Receivable in the narrow pockets or slits are flat metal attaching elements **62**, one such element being received in each pocket. These elements **62** are preferably perforated in order to allow the passage of water from one side to the other side during the wringing or wetting of the mop.

Each attaching element **62** is connected to the side plate thereabove by means of an adjustable connection which draws the elements upwardly toward the plate. This connection preferably comprises a wing nut assembly including a bolt member **64** passing through each element **62** and headed or otherwise enlarged at its lower end as indicated at **66** for engagement with the underside of the element. The upper end of the bolt member projects through a hole **67** in the sponge material thereabove and through an aligned hole in the plate with which it is associated and threaded on the upper projecting end thereof is wing nut **68**. The portion of each bolt **64** passing through the attaching element is preferably squared or otherwise non-circularly shaped so as to prevent the bolt from turning when the nut is threaded thereon. It is evident that upon rotation of the wing nut in one direction it will axially advance the bolt **66** upwardly carrying the plate element **62** therewith and all portions of the sponge block between the same and the plate. This will compressively secure the sponge block to the underside of the plate. As shown in Figures 1 and 2, each side plate **12** and **14** is provided with two such wing nut assemblies and associated clamping elements **62**.

The operation of the mop device is readily apparent. When used for mopping surface areas the plate members **12, 14** and **16** assume the coplanar relationship shown in Figures 2 and 3. To wet or wring out the mop, the operator grasps the handle with one hand and with the other hand grasps the upper end section of the sleeve **40** and pushes the latter downwardly. Downward movement of the sleeve will cause the arms **42-42** to travel downwardly toward the mop head and by virtue of the rigid links **44-44** swing to two side plate members simultaneously in a downward arc about their respective hinge axes. Regardless of the angular relationship of the handle **10** to the plane of the mop head, this action will occur.

The sponge block **18** preferably is of a thickness such that when one section thereof under one of the side plates is brought up into facial contact with the other section thereof under the other side plates as shown in Figure 1, the combined thickness of the two sections is greater than the latteral dimension or width of the middle supporting member **16**. Thus, as further downward force is exerted on the sleeve **40**, the sponge block will be evenly compressed between the two side plates to squeeze out substantially all the liquid in the sponge material. To return the parts to their normal operating position, the operator may

draw back on the sleeve 40 or release his hold thereon and allow the coil springs 30 to return the side plates to the plane of the middle plate with a snap action.

Although, as shown in Figure 2, the mop head occupies a considerably wide area of the floor, yet when the side plates are swung to sponge wringing position, such as that shown in Figure 1, the lateral and fore and aft dimensions of the side plates approximate the size of the middle supporting member 16. The latter has a transverse dimension approximately one-fourth that of each of the side plates 12 and 14 in the illustrated embodiment of the invention, and it can be seen that in the wringing and wetting position the lateral dimension of the mop head is reduced to approximately one-eighth of its normal spread. As a result, the mop head can be easily inserted in the pails or buckets of conventional household size and dipped completely therein in one operation. There is no need to twist the handle in one direction or in the other in order to tip the mop head for wringing or wetting operation as has been heretofore necessary in these types of mops.

If desired, the transverse dimension of the mop head, that is the dimension parallel to the pivotal axis 38 of the handle 10, may be extended considerable distance beyond that shown in the drawings and still be able to use the same in conventional sized household pails. The enlargement of the mop head in this dimension may be accomplished by increasing the size of the side plates 12-12 between their hinged sides and their opposite sides. Since the side plates, when swung to collapse parallel relationship occupy substantially the area of the middle plate 16, the increase in the lateral dimension of the side plates will not require the use of larger size pails. Such increase in size will provide greater floor coverage without the necessity of employing larger diameter pails or buckets.

Moreover, if desired, the connecting members 50-50 of the mop head may be increased in height to raise the holes 52 thereof to a greater elevation above the side plates in order to improve the leverage between the control member 40 and the side plates. This may be desirable in those instances where greater squeezing pressure on the sponge is desired.

While there has been illustrated and described a preferred form of the invention, it will be understood that various changes and modifications therein may be made by those skilled in the art without departing from the spirit and scope of the invention. It will therefore be understood that the claims appended hereto are intended to cover all changes and modifications which fall within the true spirit and scope of the invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a mop, a handle, a mop head composed of three plate members arranged in side-by-side relationship, all three plate members having the same fore and aft dimension but the two outer plate members being larger in the lateral dimension of the mop head than the middle plate member, means hinging the adjacent sides of the outer two plate members to the middle plate member about parallel axes, means pivotally connecting the lower end of the handle to the middle plate member for swinging movement about an axis extending perpendicularly to said parallel hinge axes, control outer plate members and adapted to simultaneously swing the same about their respective hinged axes, and sponge block sections carried on the underside of at least the two outer plate members, each sponge block section provided between the upper and lower surfaces thereof with at least one substantially horizontally extending slit, and a flat perforated rigid element received in each slit of the sponge block sections having means connecting the element to the plate member with which the section is associated for drawing the element theretoward to hold the sponge block section against the underside of the plate member.

2. In a mop structure, a mop head composed of three plate members arranged in side-by-side relationship, the two outer plate members being hinged about parallel axes to the opposite sides of the middle plate member, and sponge block sections carried on the underside of at least the two outer hinged plate members, each sponge block section provided between the upper and lower surfaces thereof with at least one pocket extending substantially parallel to said surfaces and having a relatively wide horizontal dimension, a flat perforated rigid element removably received in each pocket and occupying substantially the entire area thereof, and means connecting each element to the plate member with which the section is associated and drawing the element theretoward to hold the sponge block section compressively against the under side of the plate member.

3. A mop structure including, in combination, a mop head composed of three plate members arranged in side-by-side relationship, all three plate members having the same fore and aft dimension of the mop head but the two outer plate members having a lateral dimension greater than the middle plate member, means hinging the two outer plate members to the middle plate member about parallel axes, a sponge block having an area slightly greater than the combined area of the plate members when disposed in coplanar relationship, the upper surface of the sponge block provided with a recessed area substantially equal to the combined area of the plate members into which the latter are received, said recessed area being located centrally in the upper surface of the sponge block to provide an upwardly projecting resilient flange completely around all four sides of the plate members, said sponge block further provided below each outer plate member with at least one narrow side opening pocket between the upper and lower surfaces thereof, a thin perforated plate element received in each pocket of the sponge block, and means connecting each element to the plate member with which it is associated and operable to draw the element theretoward to compressively hold the sponge block against the underside of the plate member.

4. A sponge block adapted for use in a mop head having one or more substantially horizontally extending slits between the upper and lower surfaces thereof, a perforated plate element located in each pocket, and a stud member associated with each plate element and connected at its lower end thereto, said stud members extending from the plate elements through the sponge material to th upper surface of the sponge block.

5. A sponge block for a mop head having a recessed area on the upper surface thereof providing an upwardly projecting flange of sponge material on at least three sides thereof, said sponge block being provided with at least one pocket disposed approximately midway between

narrow in vertical height and relatively wide in the lateral dimension, a perforated plate element adapted to be received in each pocket, and an attaching bolt non-rotatably connected at its lower end to the plate element and extending upwardly through the sponge material thereabove for projection beyond the upper surface of the sponge block.

6. In a mop, a mop head comprising three plates arranged in side-by-side relation with the two outer plates hinged about parallel axes to the opposite sides of the third middle plate, a handle pivotally connected at one end to the upper surface of the middle plate about an axis extending perpendicular to said parallel hinge axes, control means on the handle operatively coupled to the outer plates and having a universal connection therewith such that the outer plates are simultaneously swingable about their respective hinge axes in whatever angle the handle extends with respect to

the middle plate, sponge block sections for the two outer plates having thin flat rigid perforated elements located therein in spaced relation to the top and bottom surfaces thereof, and means detachably connecting the elements to the outer plates of the mop head and compressively clamping the sponge block sections thereto.

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